Directorate of
Intelligence

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USSR Review [redacted] 25X1

In this issue:
The Defense Burden [redacted] 25X1

September-October 1986

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SOV UR 86-005X
October 1986

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USSR Review

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September-October 1986

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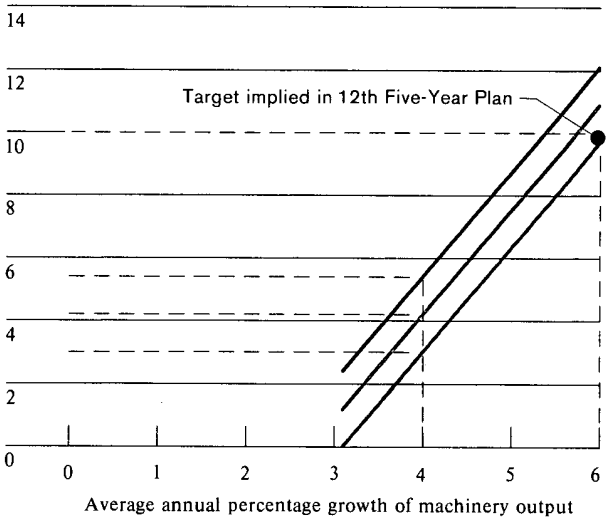
Erratum

Notice to recipients of DI document SOV UR 86-005X, [redacted] 25X1
October 1986, *USSR Review*. [redacted] 25X1

The attached graphic is to replace figure 1 on page 22. [redacted] 25X1

Figure 1
USSR: Illustrative Trade-Off Between Producer and Consumer Durables



Note: The calculations used to derive these relationships are based on information available about the Soviet 12th Five-Year Plan and, given the uncertainty of our model, are necessarily rough. The results shown suggest the approximate impacts of changes in the machinery balance but should not be interpreted as precise. The calculations depend on the following assumptions: average annual growth of military procurement at 2 percent; growth of machinery exports at 4 percent; and growth of machinery for capital repair at 5 percent.

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The Defense Burden

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Perspective: Balancing Defense Requirements With Industrial Modernization—No Easy Answers

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This issue of the *USSR Review* addresses the costs of Soviet defense and General Secretary Gorbachev's ability to manage them. Of all the problems Gorbachev will have to tackle over the next decade, decisions involving resource allocation will probably be the most difficult. Politically, this issue also will be among the most sensitive he will have to deal with, because, if not handled properly, it could bring powerful defense interests into conflict with supporters of giving more resources to industrial modernization.

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Satisfying Defense Requirements

The Soviet leadership has a good sense of the opportunity costs of the country's defense effort—in other words, its impact on the civilian economy. Though Soviet officials rarely speak in quantitative terms about the burden of defense, the very nature of Soviet planning—with its emphasis on materiel balances and physical output targets—almost certainly means that the top leadership has access to data on the share of various resources going to the military. Rarely have Soviet officials been as explicit, however, as Richard Kosolapov, at the time the editor of *Kommunist,* who told US officials in Moscow in October 1985 that achieving the leadership's modernization goals would not be possible without a substantial diversion of resources away from the military. In a similar vein,

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Gorbachev was seeking an arms control agreement because the USSR needed to concentrate its resources on the civilian economy and could not afford to compete with the United States in space.

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Some of the statements during the past year—including the first one cited above—were obviously directed at the United States and were probably designed to present a picture of a Soviet leadership desiring to devote more resources to the civilian economy but being prevented from doing so by the

US arms buildup. 25X1

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Whoever the intended audience, the 25X1
common theme is that the Soviet leadership, particularly Gorbachev, sees a need to "limit" this burden if the industrial modernization campaign is to succeed. (See the lead article in this issue for an analysis of these statements.) 25X1

The magnitude of Gorbachev's challenge can be gleaned from different measures of the USSR's military effort. The traditional yardstick is the ratio of defense spending to GNP, which has increased over the past two decades and now stands at about 15 percent, or roughly twice the US level. If an expanded concept of defense is used to account for additional activities that enhance national security or foreign policy interests—including trade subsidies to Eastern Europe, military and economic aid to client states in the Third World, and the maintenance of strategic reserves that contribute to mobilization and wartime preparedness—this figure is about 16 to 17 percent. 25X1

But, as the article "Defense's Claim on Soviet Resources" points out, such summary measures only partially reflect the costs to the Soviets of maintaining the world's largest defense establishment. For example, fully one-third of the output of the machine-building and metalworking sector—the sector that Gorbachev has singled out as key to his modernization efforts—goes for military production. Though hard information is limited, for certain types of advanced equipment produced in this sector—such as computer numerically controlled machine tools, computer-aided design systems, and flexible manufacturing systems—defense's share is probably much higher. It is precisely on the increased production and diffusion of such advanced equipment in the civilian economy, however, that the Soviets are pinning their hopes for raising productivity over the longer term. 25X1

Future Trends

The problem Gorbachev is facing is evident in our projections of future military procurement, which indicate that spending on military hardware will continue at a high level, albeit with little or no growth. This judgment is based on our analysis of Soviet weapon systems in production or in development, force requirements and trends, and defense plant capacities. It assumes that no political decisions will occur that would significantly alter the pattern of resource allocation in the next few years. 25X1

During this period, however, the leadership will have to resolve several issues that could have a major impact on defense costs. One such issue is how to respond to the Strategic Defense Initiative. As detailed in the article "Resource Implications of Soviet Reactions to the Strategic Defense Initiative," a Soviet decision to proceed with a space-based ballistic missile defense system would be enormously expensive. Even a decision to counter US efforts by rapidly expanding Soviet strategic offensive programs would be extremely costly (unless accompanied by deep cuts in spending for conventional forces) and would probably force Gorbachev to scale back his modernization goals. Indeed, many of the resources needed to support an SDI system—particularly those involving microelectronics, computers, and telecommunications—have also been cited by Gorbachev as critical for his modernization program. On the other side of the ledger, if the modernization program begins to falter, as we believe is likely, Gorbachev will almost certainly come under increased pressure to raise the current target for civilian investment—either by curtailing investment in defense industries or slowing procurement—rather than risk having his program branded a failure. In such a situation, responses to SDI would be even more painful.

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Difficult Trade-offs

The trade-offs involved in any decision to boost investment or military procurement—and the serious political risks it would entail—are discussed in the article "The Soviet Machine-Building and Metalworking Complex: Under the Gun." Given what we think are reasonable assumptions about productivity, the machinery sector will be unable to meet the demands placed on it for investment goods and also meet the targets for consumer durables output and military procurement.

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Assuming annual military procurement growth of 2 percent, achieving the investment target contained in the 1986-90 Five-Year Plan would lead to an absolute decline in consumer durables output. The plan calls for a 50-percent increase. Boosting annual growth in military procurement to 4 percent in response to SDI or other perceived security needs would cause an even greater decline and almost certainly lead to a noticeable drop in living standards. In contrast, maintaining at least some growth in consumer durables production—which would seem essential if Gorbachev is to increase worker incentives as a spur to labor productivity—could probably be achieved only by reducing overall investment growth below the goal established in the plan or by keeping procurement level.

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While it is far too early to tell how the issue of resource allocation will be settled, pressure on the defense industries to support the modernization campaign appears to be building. In a recent speech, Lev Zaykov, a

Politburo member and secretary for defense industry and general economics, said that the leadership has decided "to make more active use" of defense industries in the 1986-90 period to produce civil machinery and consumer goods and to help retool light industry. Similarly, at the party plenum in June 1986, Prime Minister Ryzhkov spoke of the leadership's intention to involve all machine-building ministries, including the defense ministries, in production for light industry. Earlier leadership statements after Gorbachev became General Secretary had merely called on defense industries to share their management expertise with the rest of industry.

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Political Pitfalls

Gorbachev's economic policies appear to command political support—both because of a consensus on the need to revitalize the industrial base (upon which the defense sector must rest) and because substantial force modernization will take place even if military procurement is held level. Nonetheless, any decision to push modernization faster than is already called for in the plan—even if defense promises to be the long-term beneficiary—will almost certainly provoke strong opposition if it means that investment in defense industries will have to be curtailed or military procurement reduced below that currently scheduled.

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Moreover, as the article "Military Opposition to the Gorbachev Program?" points out, while the military leadership appears, in general, to back Gorbachev's modernization program, the support is not universal. Several reports indicate that at least some military officers are concerned about the priority being given the modernization program. Indeed, possibly in an effort to assuage these concerns, Gorbachev went out of his way recently in a public interview to state that the USSR would "never" risk sacrificing its national security interests in an effort to solve its economic problems.

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What To Look For

In tracking Gorbachev's ability to balance the needs of the economy with the needs of the military, there should be a number of good signals of how strongly he intends to push modernization and the degree of support (or opposition) to his policies. Among the signs to look for are:

- The goals established in the 1987 plan, especially for investment and machine building.
- The replacement of Defense Minister Sokolov and the identity of his successor.
- Debate in the military or public press over the question of resource allocation.

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In the immediate future, the best indicator of how the modernization program is faring will be the goals established for the 1987 annual plan. The economic targets will be announced at a party plenum in November. A goal for investment substantially above that contained in the 1986 plan would be a good indicator that Gorbachev intends to continue to push modernization and has the political clout to do so, even if it means reining in defense in the near term. On the other hand, a lower investment target might signal that Gorbachev has been forced to slow the pace of modernization, either because the resources are not available or because of political opposition. 25X1

If Defense Minister Sokolov steps down in the coming year, his replacement should also provide a clue on how the battle over resource allocation is going. 25X1

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we believe 25X1
that there is at least a 50-percent chance that Sokolov will be replaced during the next year. The appointment of a new minister who is a strong advocate of increased defense spending would suggest that Gorbachev's policy of giving priority to modernization has run into problems. Conversely, the appointment of someone with strong ties to Gorbachev and his economic program might indicate that Gorbachev intends to go forward with his program and is trying to put himself in a stronger position to head off any complaints from the military. 25X1

Finally, any decision to make major shifts in resource allocation that depart from those agreed to at the 27th CPSU Congress earlier this year probably would be reflected in leadership speeches and writings. In particular, a decision to go more slowly on the defense buildup by reducing investment in defense industries, slowing procurement, or cutting the size of the armed forces would probably generate critical articles in the military press. This occurred in the early 1980s when then Chief of Staff Ogarkov made clear his displeasure with what he felt was the lack of priority being given defense in the face of the US buildup. Similarly, advocates of modernization and investment in machine building and metalworking, such as academician Abel Aganbegyan, could be expected to protest any retrenchment in the regime's commitment to these goals. 25X1

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Recent Soviet Commentary on the Defense Burden

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During Mikhail Gorbachev's tenure as General Secretary, Soviet political leaders and officials have frequently referred to the burden of defense in conversations with their Western counterparts and in their public statements. These references to defense spending generally depict the USSR as eager to reduce its defense expenditures, yet determined to pay whatever price is necessary to protect its vital interests. While such statements are not new, the economic context in which they are now being made suggests that they are more than just propaganda. With Gorbachev's ambitious industrial modernization program already under way and with the armed forces facing their own pressing modernization needs, statements about the burden of defense spending almost certainly reflect genuine concern in the Soviet leadership over the intensifying competition between Soviet economic and military objectives.

Recent Statements

Since Gorbachev came to power, Soviet officials, in conversations with Westerners and in Soviet unclassified media, have frequently highlighted the military's competition with other sectors of the economy for scarce resources. When French President Mitterrand visited Moscow in June, Gorbachev expressed a desire to devote resources to economic development rather than to armaments.

the Soviet Union was falling further and further behind the United States in economic and technological development. Gorbachev said that only in military technology did the Soviet Union really try to keep up and that this effort was damaging the economy. Although he insisted he would make any sacrifice necessary to maintain military parity with the United States, he feared the United States would leave the Soviets behind.

Party spokesmen at lower levels have echoed the same themes. The former editor of the party journal *Kommunist,* Richard Kosolapov, told US Embassy officials in late 1985 that Soviet economists calculate that only half the increase in production sought by the leadership can be attained without a substantial diversion of resources away from the military.

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Soviet military spokesmen have always recognized the importance of industry's contributions to defense, but until recently they rarely mentioned the economic impact of defense spending. Now, Soviet officers openly discuss the opportunity costs of resources devoted to defense. Deputy Chief of the General Staff Makhmut Gareyev, for example, wrote in an unclassified military journal in 1985 that the resources allocated to the military "must be kept within the bounds of strict necessity, so that defense will be reliable and will not be extremely burdensome for the state over time." Another military officer, writing in an unclassified Ministry of Defense publication, acknowledged that, in the interplay of resource demands for future growth, consumer welfare, and the military, "too much" defense spending is a danger to the state:

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> *It is necessary to bear in mind that, on the one hand, insufficient economic support of the Soviet armed forces can be a threat to national security, while, on the other hand, excessive use of economic resources on defense objectives and unjustifiably large military expenditures inevitably lead to a slowing of economic development. This in turn can reduce the state's military-economic power.*

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Propaganda Content

These and similar statements on the defense burden appear designed at least in part to suggest that Soviet leaders, while fully resolved to maintain the country's defenses, also sincerely want to reduce international tension by constraining the arms race. A Soviet delegate to the Nuclear and Space Talks even claimed that the goal of the Geneva negotiations is "to decrease the financial burden on our peoples."

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A number of Soviet officials have told Western audiences that Gorbachev needs an arms control agreement in order to fend off military pressure for additional weapons procurement. Such statements may be intended to convey the impression in the West that, if only the United States would show restraint in its arms programs and agree to Soviet arms proposals, Moscow would gladly reduce its own weapon programs.

Public statements of concern over the defense burden may also be intended to support internal policy. Domestic audiences may interpret such statements as indications of the seriousness of the leadership's commitment to economic development and consumer welfare. Commentary on the defense burden is also used to encourage more efficient use of resources within the military. Soviet officers have frequently noted in unclassified writings that the rising cost of weapons requires the armed forces to pay stricter attention to military-economic considerations when considering everything from weapons research and development to routine training.

Economic Concerns

If statements on the burden were only propaganda, however, we would not expect to hear them addressed to such diverse internal and external audiences. The frequency with which Soviet officials now discuss defense spending as a burden suggests that the Gorbachev regime is trying to find a better balance between competing military and civilian claims on resources.

The Industrial Modernization Program. In an effort to advance his goal of accelerating Soviet economic growth, Gorbachev has launched a vigorous campaign to modernize Soviet industry. Providing the machinery required to reequip industrial plants will impose unusually heavy demands on machine building—the sector that also produces weapons and equipment for the armed forces. Soviet leaders have stated that even those industries that specialize in defense production are to play a role in the retooling effort. In June, for example, both Zaykov and Council of Ministers Chairman Nikolay Ryzhkov told Soviet audiences that the defense industries have been tasked with producing equipment for light industry. At the June 1986 Central Committee plenum, Gorbachev emphasized that his top domestic priority is to modernize Soviet industry.

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Military Modernization. As the industrial modernization program proceeds, the Soviets are also modernizing their strategic and general purpose forces. Many of their weapon programs incorporate advanced guidance, sensor, communications, and munitions technologies. Especially in the late 1980s and beyond, production of new generations of missiles, submarines, and bombers together with advanced tactical aircraft, ships, and land arms will increase the demand for scarce, high-quality material resources and skilled labor.

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The possibility that the Soviet Union may also have to develop new weapons to respond to the US Strategic Defense Initiative (SDI) magnifies Soviet concern over the prospect of intense competition for scarce resources.[1] For example, a senior official in the Soviet Ministry of Foreign Affairs told a member of the US delegation to the Nuclear and Space Talks that responding to SDI would hurt the Soviet economy by diverting resources from other areas. While the Soviets insist that they could counter SDI more cheaply than the United States could deploy it, they nevertheless contend that it will lead to a costly arms race,

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[1] For a discussion of the possible resource costs of a Soviet response to SDI, see "Resource Implications of Soviet Reactions to the Strategic Defense Initiative" in this issue of the *USSR Review.*

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which they would prefer to avoid.

Prospects

Over the next two or three years, the growth that we anticipate for the Soviet economy will probably allow the Soviets to maintain their defense outlays at the high levels of recent years—and even to accelerate them slightly—while at the same time making progress toward their industrial modernization goals. The significant modernization of defense industrial capacity in the late 1970s and early 1980s, which provided the Soviets enough capacity to produce almost all the weapons that we project for delivery through the end of this decade, will ease short-term competition for investment resources between defense and civilian claimants. Competition for scarce, high-quality resources such as advanced materials and microelectronic components is likely to be more intense, however, and could require the leadership to make difficult choices between civilian industrial modernization projects and weapon procurement programs.

The Soviets evidently hope that their current high rates of investment will quickly lead to gains in productivity that will sustain economic growth while allowing the rate of growth of investment to level off. If this strategy is successful, additional resources could be available for accelerating defense procurement. If, however, the Soviets fail to achieve the high productivity gains that the modernization program projects, they may choose to compensate for productivity shortfalls by increasing investment to levels above those currently scheduled for the final years of the 1986-90 Five-Year Plan. Such a decision would require resources that would otherwise be available for an acceleration of the military buildup.

By the end of the 1980s, the competition between defense and the civilian modernization program will be further complicated by the Soviets' need to retool their defense plants to produce the new generations of weapons that will be required in the 1990s. If Gorbachev's efforts to accelerate growth are not yielding satisfactory results by that time, the competition between his defense and economic objectives is likely to be especially intense. 25X1 25X1 25X1

In the meantime, Gorbachev probably hopes that his arms control initiatives will pressure the United States to curtail its military programs. If the pace of US military modernization slows, the Soviets could gain additional breathing space for pursuing the industrial modernization program that Gorbachev considers crucial to meeting future military, political, and economic challenges. 25X1

Although recent Soviet statements on the burden of defense reflect the Soviet leaders' concern over the growing difficulty of achieving both their civilian and defense objectives, they shed little light on how the leadership will resolve conflicting resource demands. Future Soviet commentary on the relationship between defense and the economy may provide some clues. Spokesmen who emphasize the current or near-term threat posed by US forces may think military programs should be given priority over civilian industrial modernization. Advocates of this view would probably discuss the economic dimension of national security only in terms of the economy's ability to provide the armed forces the weapons and supplies they need. Officials who favor giving priority to civilian industrial modernization would probably discuss the economy's contribution to national security in broader terms, emphasizing the importance of a strong economy for supporting Soviet foreign policy, maintaining a competitive position in world markets, insulating the country from Western economic sanctions, and sustaining long-term military competition with the United States in the production of state-of-the-art weapon systems. Spokesmen for this view, while acknowledging the importance of maintaining adequate military forces, would be more likely also to note the negative effect that defense spending can have on economic growth. 25X1 225X1

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Defense's Claim on Soviet Resources

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Under Mikhail Gorbachev, as in recent periods, Moscow's ability to allocate resources to the civilian economy is constrained by heavy commitments to military programs. Defense currently accounts for a large share of gross national product (GNP) and even larger shares of the output of the key machine-building, metals, and energy sectors. Because these industries have been given key roles in Gorbachev's campaign to modernize the economy, the Soviet leadership has strong incentives to hold down the amount of resources allocated for defense. Reallocating already committed labor and capital from defense to civilian modernization programs would be complicated by the specialized nature of many defense resources and, although technically feasible, would undoubtedly run into stiff political opposition.

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Macroeconomic Measures

Share of GNP. Defense, measured in constant 1982 prices and using a standard definition—military research, development, testing, and evaluation (RDT&E); procurement; operations and maintenance (O&M); personnel costs; and construction—accounted for a large but roughly stable share of GNP—about 15 percent during the 1970-85 period (see figure 1). When additional costs of Soviet efforts to advance the USSR's global position and pursue mobilization objectives are taken into account, defense's share of GNP was larger and grew from about 16 percent in the early 1970s to a peak of almost 19 percent 10 years later.[1] Currently, it is about 16 to 17 percent.

These constant price estimates are useful for measuring growth over time, excluding the effects of inflation. However, because these estimates do not illustrate actual year-to-year changes—the changes policymakers in the Kremlin would see—we also use current price estimates. These estimates show that defense's share of GNP rose from 13-14 percent in 1970 to 14-15 percent in 1982 using the standard

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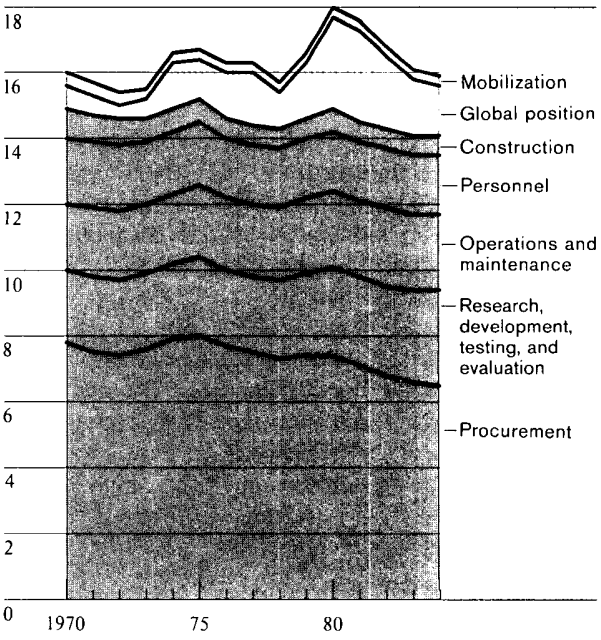
Figure 1
USSR: Defense as a Share of Gross National Product in Constant Rubles, 1970-84

Percent



The additional costs for mobilization and wartime preparation and enhancing the Soviets' global position account for 1 to 3 percent of GNP, with economic and military aid making up a large part of this amount. The sharp rise in 1980-81 was caused by unusually large amounts of oil subsidies for Eastern Europe during those years.

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[1] These costs include expenditures on activities such as military and economic aid, foreign information and exchanges, the maintenance of strategic reserves, and maintaining an industrial surge capacity. Most of the incremental cost was related to attempts at furthering Soviet foreign policy goals, with mobilization costs a small, fairly constant, amount.

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definition and from 14-15 percent in 1970 to over 17 percent in 1982 using the broader definition. Although these calculations can only be performed for these two years because of data limitations, they emphasize the impact of different rates of price change between defense and civilian goods.

Capital Stock.

Measured in current rubles, the defense sector directly or indirectly used about 14 percent of Soviet capital stock in 1972 and about 15 percent in 1982. About one-half of the total in both years consisted of indirect uses, that is, capital used to produce the materials and equipment consumed in producing weapons and materiel for the armed forces.

Labor. In 1972 and 1982, defense also employed a sizable share of the Soviet labor force. The number of military conscripts, officers, active-duty reservists, and employees of the Ministry of Defense, for example, grew from over 6 million in 1972 to approximately 7 million in 1985—a roughly constant 5 percent of the total Soviet labor force.

A large part of the industrial labor force, moreover, is occupied directly or indirectly in supporting defense. When combined with military manpower, these workers raised defense's share of the total Soviet labor force from 12 percent in 1972 to 13 percent in 1982 (see table).

Defense's Share of the Soviet Labor Force

Millions of persons (except where noted)

	1972	1982
Total, all categories	**15.3**	**18.6**
Military manpower	5.4	6.0
Military reserves [a]	0.1	0.1
Ministry of Defense civilians	0.8	0.8
Other civilian workers employed in support of defense	9.0	11.7
Share of total labor force (*percent*)	12	13

[a] Reservists are called up infrequently and for varying periods of time. Therefore, we have converted this estimate into man-years to make it equivalent to the other categories.

The Sectoral Impact

Input-output analysis also makes it possible to estimate the impact of defense for 1972 and 1982 on specific sectors of the economy. These estimates—calculated in current prices—indicate that defense consumed large shares of the output of some key industrial sectors in these years (see figure 2). In 10 of the 15 sectors surveyed, including all of the heavy industrial sectors, the share of output going to defense rose between 1972 and 1982. Much of the growth was the result of inflation. When measured in constant 1982 prices, the shares, on average, were roughly stable.

Machine Building and Metalworking (MBMW). Defense's large claims on MBMW output are especially important because this sector—which produces investment machinery and equipment and consumer durables as well as military hardware—supplies the goods required for future growth and for increasing worker incentives. moreover, that defense consumes especially large shares of the key MBMW subsectors producing electronics and transportation equipment. In the microelectronics industry, for example, the military has first claim on the output and therefore not only obtains large quantities of output but also takes the highest quality parts as well. Regarding transportation equipment, military needs not only consume resources that could be used in the production of uniquely civilian vehicles but also divert many general purpose vehicles such as trucks and aircraft to the armed forces. The military, for example, receives an estimated one-third of annual truck production.

Metallurgy. The defense sector's consumption of metals has also been costly to the Soviet economy. Rough estimates based mainly on weapons production data

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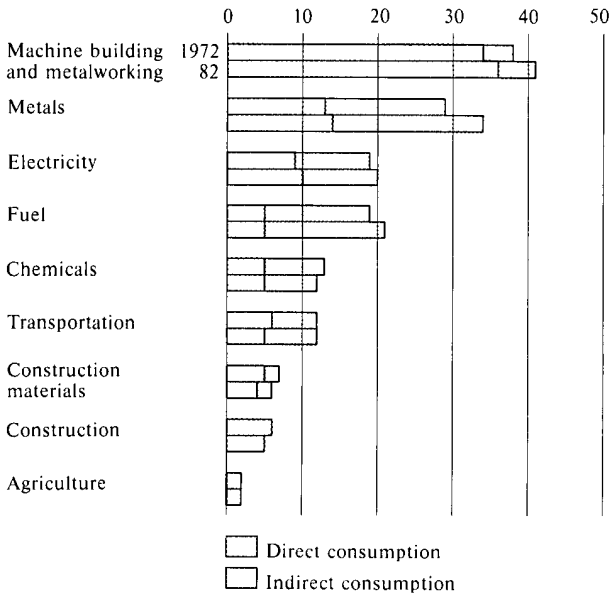
Figure 2
USSR: Share of Sectoral Output Consumed by Defense

Percent



The shaded portion represents the value of a sector's direct deliveries to defense as a share of gross value of output (GVO). The remainder is the share of GVO used to make the inputs, such as energy and steel, that are used in producing goods and services for defense.

GVO is a widely used Soviet measure of output that includes the value of intermediate goods as well as the total value of any final product. Although GVO includes some double counting of output, its use as a standard for estimating defense's claim on resources better reflects the use of sector productive capacity than the use of another measure such as value added.

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suggest that roughly 15 percent of Soviet aluminum, for example, goes directly to military production. The Soviet military probably also accounts for the bulk of titanium, cobalt, and beryllium consumption, as well as being a large consumer of nickel. Defense production claims about 10 percent of rolled steel output, consuming an even larger share of high-tensile-strength alloys and superhard steel. 25X1

Energy. The defense sector's direct and indirect consumption of energy accounts for about 20 percent of Soviet energy output. Direct fuel consumption by the armed forces accounts for less than 5 percent of Soviet fuel output but consists primarily of the light oil products—diesel and jet fuel and gasoline—where national demand is outstripping supply. The largest component of fuel and electric power use by defense is the energy used indirectly to produce the metal, machinery, nuclear materials, and other energy-intensive products used in the defense sector. 25X1

The Transferability of Resources

However large the pool of defense resources might be, these resources have little immediate value to the rest of the Soviet economy if they are not quickly transferable. Some resources are easily transferable—hard currency, for example, can be rapidly switched from supporting an ally to purchasing Western machinery. As illustrated by both Soviet and US attempts since World War II to switch from defense to civilian production, however, there are numerous short-term barriers to conversion of most resources. A common experience in both economies was that the difficulty of transferability was proportional to the degree of specialization of the resource. This was true for labor, material inputs, capital equipment, and plants. Presumably, the same considerations hold true today. 25X1

There are also systemic barriers to converting a defense plant into a civilian plant. Long-established supply networks might be disrupted, particularly if the new civilian plant needed different inputs. If the plant had supplied intermediate goods to another plant, the second plant would have to find a new supplier. Transferring the defense plants' traditional priority access to scarce raw materials—although very easy to order and having the potential to break many civilian bottlenecks—would also disrupt supply chains. In each case, the already strained transportation network would have to adjust to meet the new requirements. 25X1 25X1

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Although such transferability problems are certainly formidable, they can be overcome. The Soviet conversion of retired aircraft engines into industrial gas turbines in Kazan' during the early 1980s is an illustration of a successful shift of resources from a military to a civilian program. It took only two years to redesign and assemble a prototype of the GPA-Ts-16 gas turbine, by mating a compressor with a modified NK-8 aircraft engine.

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Prospects

Although transferring resources from defense to civilian production would be technically feasible, a sizable shift would require a difficult political decision that the leadership would be reluctant to take because of the negative long-term impact such a move might

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have on Soviet military power. Temporarily restraining the growth of military programs, in contrast, probably would be a more attractive policy option to the leadership. Curbing military demand for machinery, metals, and energy during the next few years would enhance the prospects of the leadership's high-priority campaigns to modernize industry and accelerate growth—campaigns that are critically dependent upon increasing the delivery of these resources to the civilian economy. If these campaigns were to succeed, moreover, the economy would ultimately be better able to supply the armed forces with the advanced technology and materials required to counter US and NATO military programs. Meanwhile, with the defense sector's resources left intact, deliveries of weapons and equipment to the armed forces could remain at the high levels of recent years, and Soviet military capabilities could continue to increase.

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The pace at which the Soviets proceed with the procurement of major weapon systems such as the SS-25 mobile ICBM probably would provide the clearest indication of a leadership decision to restrain the growth of military programs. Signs of military dissatisfaction with defense spending plans—expressed, for example, in frequent calls for an accelerated defense effort in the speeches and writings of Soviet military leaders—might also provide an indication that the political leadership had opted for such a course.

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Were the Soviets to significantly reduce the resources allocated to defense programs, indications of military dissatisfaction would probably be clearer and less equivocal than if the military were only faced with the prospect of slower defense spending growth. In addition, the impact on the pace of at least some military procurement programs might be so pronounced that it would be quickly apparent to us. If reductions in military manpower were involved, the leadership might seek to derive propaganda advantages from the cutbacks by announcing that they were being carried out in an effort to reduce military tensions with the United States. We believe, however, that major reductions would occur only if Gorbachev's economic programs fell extremely short of plan, resulting in major economic disruptions.

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The Soviet Machine-Building and Metalworking Complex: Under the Gun

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If there is to be a breakdown in machine building, then there will also be a breakdown in the whole national economy.

Mikhail S. Gorbachev
8 April 1986

Since his rise to power in March 1985, General Secretary Gorbachev has placed the machine-building and metalworking (MBMW) sector at the center of his drive to modernize civil industry and to revitalize the troubled economy. He has repeatedly indicated that the MBMW sector is to provide the highly sophisticated and productive machinery necessary to reinvigorate the industrial base and to allow Soviet manufacturers to compete at the highest levels of international standards. In pursuing this goal, however, Gorbachev risks overtaxing the sector and its ability to supply machinery products to civilian consumers and the military.

The Machine-Building Sector: An Overview

The MBMW sector is the hub of Soviet industry. Responsible for over one-third of the value of industrial production, it produces machinery for investment, consumer durables for individuals and public institutions, equipment and parts for repair and maintenance of existing machinery, and weapons and support equipment for the military. Of the 20 industrial ministries that make up the machine-building sector, nine specialize in military goods and are overseen at the highest levels of the government by the Military-Industrial Commission (VPK) (see inset). The 11 other ministries produce mostly civilian goods, and their activities are coordinated by the Council of Ministers' Machine-Building Bureau, created under Gorbachev in 1985 to lend national direction to industrial modernization.

The current state of affairs in the MBMW sector is mixed. The defense industries underwent a substantial expansion and upgrading during the 1970s. As a result, they are in a fairly strong position in the near term to support demands for modern, highly complex weapons, such as those advanced systems currently in production.[1] Persistent emphasis on quantity over quality and decades of slow capital turnover, however, have left the civil machine-building enterprises with an antiquated, labor-intensive production base. In mid-1986, Gorbachev outlined the longstanding pattern of neglect:

> *Unjustified enthusiasm for the erection of new enterprises and neglect of the requirements of the existing ones became standard with the planning agencies and many ministries. Most machinery and equipment went to the new facilities, while a timely replacement of the obsolete equipment in existing facilities and plants actually was not done. The process of asset renewal was too slow and the age structure of existing assets worsened.*

Commensurate with the increase in the share of aged machinery and equipment has been the need for increased repair and maintenance. Indeed, at least a tenth of the industrial labor force and a third of the stock of machine tools have been devoted to capital repair, which over the lives of the machinery typically exceeds original investment costs.

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Gorbachev's Agenda: Overhaul the Civil MBMW Sector

To reverse this negative trend, Gorbachev has developed an ambitious plan to revitalize the civil MBMW ministries. He has publicly called for:

- Increasing the retirement rate of machinery in the civil machine-building sector from 2.2 percent in 1984 to 9.7 percent in 1990.
- Increasing the output of the civil machine-building sector by 43 percent between 1985 and 1990.

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Ministries of the Machine-Building and Metalworking Sector [a]

Defense	*Aviation Industry*
	Communications Equipment Industry
	Defense Industry (land arms and missiles)
	Electronics Industry
	General Machine Building (ballistic missiles and space systems)
	Machine Building (conventional munitions)
	Medium Machine Building (nuclear weapons)
	Radio Industry (radars and computers)
	Shipbuilding Industry
Civil	*Automotive Industry*
	Chemical and Petroleum Machine Building
	Construction, Road, and Municipal Machine Building
	Electrical Equipment Industry
	Heavy and Transport Machine Building
	Instrument Making, Automation Equipment, and Control Systems
	Machine Building for Animal Husbandry and Fodder Production
	Machine Building for Light and Food Industry and Household Appliances
	Machine Tool and Tool Building Industry
	Power Machine Building
	Tractor and Agricultural Machine Building

[a] *The bifurcation of the MBMW ministries into civil and defense sectors is not meant to imply that production is neatly segregated. To the contrary, the civil ministries produce items such as military trucks, armored vehicles, and tanks, while the defense ministries produce—among other civil goods—televisions, refrigerators, and computers.*

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- Pushing capital investment in civilian machine building up in 1986-90 to 1.8 times the 1981-85 level.
- Emulating defense-industrial practice, particularly defense management techniques.

Gorbachev has also insisted on sustained increases in the quantity and quality of machinery and equipment he believes are vital to industrial modernization: machine tools and tooling equipment, robots and flexible manufacturing systems, microelectronics and computers, automated management systems, and telecommunications. According to the 1986 plan, the Ministry of the Machine Tool Industry, the primary manufacturer of machine tools and flexible machine systems, is to receive a 42-percent increase in investment in 1986 alone. Industry trade journals imply that the production of robots—primarily conducted in the Ministry of the Automotive Industry—is slated to increase by at least 10 percent a year during the 12th Five-Year Plan (FYP), covering the period 1986-90. The major civilian producers of microelectronic components, computers, automated management systems, and telecommunications equipment have also been targeted for substantial growth and development. In addition, the Soviets are counting on increased industrial cooperation and larger quantities of high-quality machinery imports from Bloc countries.

Gorbachev's plan is to push the MBMW sector (and hence industry and the economy) onto an "intensified path of development." He believes that, as new machines and equipment become part of the capital stock in other sectors, they will carry scientific and technological advances throughout the economy. As existing equipment is retired at accelerated rates and replaced by advanced equipment, the whole process will intensify as the stock of capital in the machinery sector itself is modernized and becomes efficient in producing technologically advanced machinery. Accordingly, overall growth is scheduled to pick up during the 1986-90 Plan and to accelerate still more in the 1990s.

Rising Demand for MBMW Output

Gorbachev's plans for the MBMW sector entail considerable risk. Not only must the complex provide increased quantities, better quality, and a new assortment of machinery, but it must also support an accelerated consumer goods program and meet the leadership's plans for military hardware procurement. All of this is to be accomplished while increasing retirements of existing equipment and absorbing unprecedented increases in investment in the civil MBMW ministries. 25X1 25X1

We do not know the Soviets' specific plans for allocating MBMW output and are therefore unable to estimate the exact nature of the competition in the interplay of machinery demands for future growth, advancing consumer welfare and meeting military procurement targets. At the same time, however, an analysis of the FYP, of public statements by Soviet leaders, and of expected military needs provides indications of the requirements for machinery by various end users:

- Speaking before the June session of the Supreme Soviet, Nikolay Ryzhkov, Chairman of the Council of Ministers, implied that the production of consumer durables is to increase by 8 percent per year between 1985 and 1990.

- As stated in the new FYP, targets for total investment and for construction and installation work indicate that the machinery component of new fixed investment would need to rise by about 7 percent per year. 25X1

- Projections of Soviet force deployments indicate that procurement of military hardware will remain high, albeit with little or no growth during the rest of the decade. 25X1

To meet these demands for machinery, MBMW output must rise dramatically—particularly because imports of machinery are likely to grow only slowly. Hard currency constraints will limit the overall level of imports of machinery from the West. Some increase in machinery imports from Eastern Europe can be expected, but the poor state of economic health throughout the Bloc will probably prohibit an increase commensurate with Soviet expectations. Thus, with the substantial imported machinery component of investment not growing much, Soviet domestic production of producer durables would have to increase 25X1

at an extremely high rate of roughly 10 percent per year in order to meet the planned growth of the total machinery component of investment. Taking into account the plan for growth in consumer durables and our projections of military hardware procurement, we estimate that total machinery output would have to rise annually by nearly 6 percent per year during 1986-90, well above the 2-percent average attained during 1981-85.

Moscow has only limited options for accelerating the growth of machinery output in the 1986-90 period. Gorbachev's campaign to increase labor discipline throughout the economy will certainly affect the machinery sector as well and probably boost labor productivity somewhat. In addition, Moscow plans a massive commitment of investment resources to the civil machinery sector. The success of this policy, however, hinges on the capability of civil machine builders to make productive use of this investment and also to receive adequate material and other inputs.

Machinery Production: Not Enough To Go Around

The Soviet leadership has committed substantial investment resources to the MBMW sector. Indeed, in August, Lev Zaykov, Politburo member and secretary for defense industry and general economics, warned that the machine-building complex has been given everything that the economy could permit. According to Ryzhkov, investment in MBMW is planned to total 63 billion rubles during 1986-90.[2] Although the major expansion of production facilities in the 1970s met most of the immediate needs of the defense industries for investment, we believe investment in this sector is likely to increase as well—albeit at a much lower level than for the civil MBMW ministries. Assuming investment in the defense industries increases 10 percent in 1986-90 over 1981-85, investment growth for the entire machine-building sector would be an enormous 45 percent, compared with an 18-percent increase in 1981-85 over that of 1976-80. 25X1

Investment of this magnitude could substantially increase the productive capacity of the MBMW sector. Whether this in turn will lead to corresponding increases in the quantity and quality of machinery production depends largely on how willing the leadership is to allow enterprise managers the time and flexibility to retool their production lines without the ever-present pressure for increases in current production. 25X1 25X1

Productivity Increases: How Much, How Soon?

Gorbachev must reverse the negative trend in the productivity of investment if he is to gain a significant return on the scheduled allocation to the machinery sector. During 1971-75, Moscow invested 43 billion rubles (1984 prices) in the machinery sector, and annual output increased by 18 billion rubles. Ten years later, in 1981-85, investment in this sector was 73 billion rubles, while annual output increased only about 6 billion rubles. A number of factors have contributed to this decline in returns from investment, including slow retirement of fixed assets and, most important, relatively small improvements in the quality of invested machinery. 25X1 25X1

Gains in the productivity of investment will depend in large part on adding new machinery and equipment incorporating advanced technology while also increasingly discarding obsolete and wornout assets. The annual rate of replacement of the Soviet stock of plant and equipment is about 2 percent, compared with 8 to 9 percent for the United States and 11 percent for Japan. Moscow plans to dramatically increase this retirement rate in 1986-90, but it is not certain that this can be achieved given traditional incentives among Soviet managers to hoard resources, including capital stock. Can the quality of invested machinery be improved? Machine builders must turn out the equipment needed to meet the investment goals both for modernizing their own sector and for the rest of the economy. The resulting intense pressures on machine builders to boost quantity of output, however, will reinforce the tendency to reproduce the same

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[2] We believe the ruble amount used by Ryzhkov embraces the planned value (in 1984 prices) for the civil ministries only. Although the Soviets have been inconsistent in their references to the MBMW sector, on several occasions they have clearly stated that they are referring to the 11 civil ministries when indicating growth in investment. An examination of planned and past investment figures tends to confirm their restricted use of the term: 63 billion rubles is an amount well below the 73 billion rubles invested in the entire MBMW sector during 1981-85. This and other evidence indicate that Ryzhkov's figure almost certainly represents an 80-percent boost over the aggregate investments for the 11 civilian machinery ministries for 1981-85.

Estimating the Growth Rate for Output of Machinery

Soviet hopes for increasing the output of the machine-building and metalworking sector during the 12th Five-Year Plan rest upon the achievement of dramatic improvements in the efficiency with which the Soviet economy uses metal.

- *Plans for production of rolled ferrous metal and ferrous ores suggest metallurgy output will increase less than 2 percent per year.*
- *Machine building takes about 80 percent of the net output of the ferrous and nonferrous metallurgy sectors. As a result, it will be difficult to increase machine building's current share of metal deliveries by more than a few percentage points.*
- *Under these assumptions, in order for machine building to grow at 6 percent per year, the Soviets must increase their efficiency in using metal by over 3 percent per year.*
- *However, the Soviet economy, on average, has become only about 1 percent per year more efficient in its use of metal since 1970.*

Even if the Soviets can improve their historical performance, or increase slightly the machine-building priority for metals, we do not expect machinery output to grow by more than 4 percent per year, on average.

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pattern of output that has prevailed for years and provide little slack for incorporating technological advances.

Paying for the Investment Shift: Bottlenecks

Another key factor that will influence the productivity of the investment shift toward machine building will be the availability of adequate material resources to support the additions to production capacity. We have estimated the output that the ferrous and nonferrous metallurgical branches must provide to support the implied rapid growth in machinery production. Our analysis suggests that shortages of ferrous and nonferrous metals could hold back the growth of machinery output (see inset). While these imbalances in the economy can be overcome in the short run through inventory drawdowns, eventually they would have to be met through investment shifts. Thus, the massive reallocation of investment into machine building—at the expense of other sectors—could lead to bottlenecks that eventually will limit the growth of machinery production itself.

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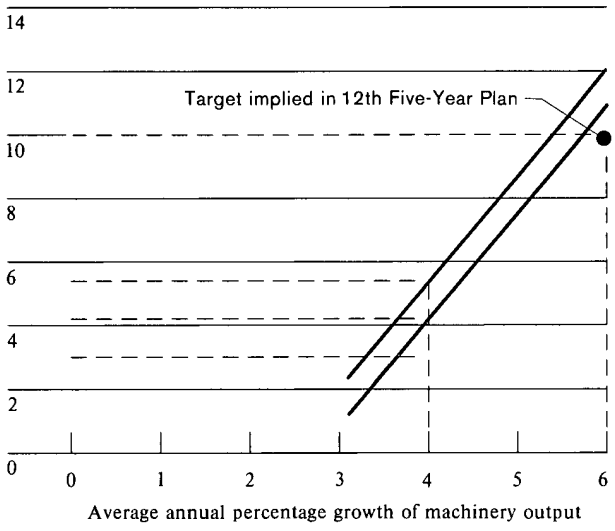
Implications and Outlook

Taking account of these problems, we believe that the average annual output growth during the 1986-90 plan period will be more in the range of 3 to 4 percent rather than 6 percent. Given this estimate, one illustrative scenario for growth in the three major claimants on this output is the following (see also figures 1 and 2):

- Domestic producer durables growing at 6 percent per year (instead of the necessary 10 percent).
- Consumer durables growing at approximately 2 percent per year (instead of the targeted 8 percent).
- Military procurement also growing at about 2 percent per year.

Figure 1
USSR: Illustrative Trade-Off Between Producer and Consumer Durables



Note: The calculations used to derive these relationships are based on information available about the Soviet 12th Five-Year Plan and, given the uncertainty of our model, are necessarily rough. The results shown suggest the approximate impacts of changes in the machinery balance but should not be interpreted as precise. The calculations depend on the following assumptions: average annual growth of military procurement at 2 percent; growth of machinery exports at 4 percent; and growth of machinery for capital repair at 5 percent.

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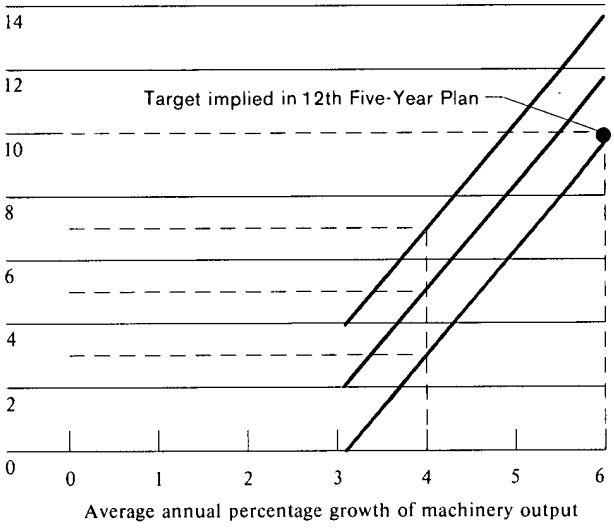
Figure 2
USSR: Illustrative Trade-Off Between Producer Durables and Military Procurement



Note: The calculations used to derive these relationships are based on information available about the Soviet 12th Five-Year Plan and, given the uncertainty of our model, are necessarily rough. The results shown suggest the approximate impacts of changes in the machinery balance but should not be interpreted as precise. The calculations depend on the following assumptions: average annual growth of consumer durables at 8 percent; growth of machinery exports at 4 percent; and growth of machinery for capital repair at 5 percent.

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This would allow the machinery component of investment to grow at about 4 percent per year—somewhat faster if imports of machinery could be stepped up.

Under such a scenario, Gorbachev might react by increasing the already high pressures on MBMW managers to produce. In July two key machine-building ministers, including one promoted under Gorbachev, were dismissed for unsatisfactory performance. If the machinery sector continues to underfulfill its plans, additional personnel changes in the MBMW ministries are highly likely. Although such actions may yield higher production, they may ultimately prove counterproductive, as MBMW officials seek quantity growth at the expense of quality.

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In addition, Gorbachev may seek to shift the allocation of raw and semiprocessed materials away from consumer durables and/or military hardware. It is unclear how much additional material could be effectively utilized in boosting the output of producer

durables. On the one hand, transferring materials from defense production would probably have a larger impact than transferring them from production of consumer goods. On the other hand, Gorbachev probably would encounter less resistence to a transfer of resources away from the production of consumer goods than from the production of military hardware. In any event, if Gorbachev gives absolute priority to either his modernization program or consumers, other uses of machinery will be squeezed severely. For example, if the modernization program, and thus the production of producer durables, is given top priority, an absolute decline in either military procurement or consumer durable production—or no growth of either—would be required during 1986-90. [redacted] 25X1

Although we have no evidence of any decision to reduce the level of defense spending below the level that has prevailed for the past decade, we have witnessed a strong push for meeting consumer-durable targets that will affect and even involve defense industries. Both Ryzhkov and Zaykov, for example, have declared publicly that the defense industry will step up its production of civilian goods and aid in retooling light industry. In addition, in mid-1986 the Soviets took the highly unusual step of strongly criticizing three defense-industrial ministers for the poor quality of television sets produced by their enterprises. [redacted] 25X1

Directing resource allocations away from the defense industries would probably encounter resistance from the military and hawkish circles of the political leadership. Nevertheless, the greater the share of investment machinery planners devote to nondefense purposes in the 1980s, the better the prospects for improving the production capabilities of civil industry, which will in turn ultimately benefit the defense sector and its ability to meet the military-technological challenges of the 1990s and beyond. [redacted] 25X1

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Resource Implications of Soviet Reactions to the Strategic Defense Initiative

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The United States Strategic Defense Initiative (SDI) confronts the Soviet Union with potentially enormous technological and industrial challenges. Responding to SDI would entail large investment and procurement costs, tie up scarce skilled labor and high-quality material resources, and place a premium on technologies that the Soviets have found difficult to develop and assimilate—for example, high-speed data and signal processing; advanced sensors; precision manufacturing; and advanced command, control, and communications software. The Soviets would have ample time to respond to the US initiative within their regular planning cycle and probably would not be forced to make major resource commitments until the 1990s. Because the Soviet Union has set ambitious goals for economic growth and military modernization through the 1990s, however, responding to SDI would eventually require a diversion of resources from other important military or civilian programs.

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Estimating Approach

Because the United States will not select a specific SDI architecture until the early 1990s and will not make a deployment decision until the early-to-mid-1990s, it is too early to project the specific countermeasures the Soviets may choose or to estimate their overall cost.

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The cost estimates presented in this article are not comprehensive. They include investment and procurement costs, but exclude development, operations, and maintenance costs. Because procurement generally is a major share of total life-cycle costs of Soviet strategic weapons, our estimates probably provide a general sense of the costs the Soviets would face if they responded to SDI by significantly expanding weapons production.[1] We are not, however, projecting that the Soviets would actually respond to SDI with the specific types and levels of forces used in our estimates or that these force levels would be adequate or effective responses to SDI (see inset).

Potential Soviet Responses to SDI

If the Soviets responded to SDI by increasing their strategic forces, they could select one or more of the following options:

- Expanding their strategic offensive nuclear forces in an effort to saturate US ballistic missile defenses (BMD).
- Increasing production and deployment of long-range cruise missiles and delivery platforms in an effort to circumvent US BMD.
- Deploying defense-suppression weapons such as antisatellite weapons (ASATs) capable of directly attacking US strategic defenses.
- Expanding their own ballistic missile defenses.

Saturation. If the Soviets chose to acquire the capability to saturate US BMD, they might expand deployment of their land-based ballistic missile systems.

Planning a Response

Because the United States will not make deployment decisions on advanced strategic defenses until the early-to-mid-1990s, we think the Soviet Union has ample time to respond to SDI within its regular planning cycle and is unlikely to undertake any crash programs in response to the US initiative. The Soviets are already grappling with the challenges SDI presents, however, and are probably incorporating potential SDI response options in their long-term plans. These plans, which look out over a 15-year horizon, project industrial and technological developments that will be necessary to support expected mission requirements.

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The Soviets will incorporate specific responses to SDI in their five-year plans, which commit capital investment and resources to major programs that are ongoing or will be initiated during the plan periods.

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The Soviets may have taken some steps to refocus their research efforts since SDI began, but we do not expect any major increases in the funding of Soviet SDI-related projects before the 13th Five-Year Plan (1991-95). The Soviets will make key decisions supporting this plan during 1988 to 1989. By this time, they will have much more information about potential SDI architectures, and, in the wake of the next US presidential election, will be better able to judge the likelihood of SDI deployment.

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Opportunity Costs

Resource demands imposed by an SDI response would hit the Soviet economy at a critical juncture. General Secretary Gorbachev is trying to reverse two decades of declining growth in the Soviet economy with a strategy that emphasizes the acceleration of investment. His ambitious industrial modernization program and current military procurement plans provide little if any slack for undertaking major new programs in the near term without jeopardizing existing commitments. Unless the economy grows at a significantly higher rate than we expect, choosing SDI response options considered in this analysis would force the Soviets either to bear a higher defense burden than they have in recent years or to curtail some civilian or non-SDI-related military programs, such as space science and exploration, telecommunications, advanced conventional weapons and munitions, and electronic warfare systems. 25X1

The severity of these trade-offs would depend on the performance of the Soviet economy over the next decade. If Gorbachev's industrial modernization program succeeds in accelerating Soviet economic growth over the next few years, the Soviet economy will be better able to produce advanced technology systems for both military and civilian uses in the 1990s. The feasibility of all Soviet response options will ultimately depend upon the availability of high-technology human and material resources. To respond successfully to US deployment of advanced strategic defenses, the Soviets would be forced to improve their performance in a number of key technologies in which they have been historically weak, such as microelectronics, computer hardware and software, and sensors. In addition, the Soviet Union would have to increase its supply of advanced production equipment and skilled labor to both respond to SDI and meet other military and civilian needs. Current Soviet military programs already demand a large share of these resources. If the Soviet Union fails to modernize its industrial base, it will ultimately be less capable of responding to future military challenges, including SDI. 25X1

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Military Opposition to the Gorbachev Program?

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Gorbachev's efforts to restrain the growth of defense spending and modify Soviet positions on several sensitive security issues are causing some uneasiness within the military. Gorbachev has demonstrated that he can manage the military for now, and his Politburo colleagues appear to be giving him time to demonstrate that his domestic and foreign policies will work. Over the longer term, however, a challenge from some of his colleagues who share the concerns of the military could force him to modify some of his policies, particularly if his modernization drive falters or his foreign policy efforts do not produce the political outcomes he seeks.

Gorbachev's Security Policy

Gorbachev has made the modernization of the Soviet economy an important part of his security policy. His focus on civilian investment has inevitably challenged the economic priority accorded the military (see "Defense's Claim on Soviet Resources"):

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- some military officers believe Gorbachev intends to budget less for defense and are dissatisfied because their interests would be adversely affected.

To help justify the strategy, Gorbachev and his political allies have noted that economic weakness has security implications. In his interview with the Czechoslovak party daily in September, Gorbachev argued that "if we become stronger and more solid economically, politically, and socially, the capitalist world will show greater interest in normal relations with us." Supporters in the Central Committee have claimed that Western aggressiveness increased when the USSR began to face serious economic problems in the late 1970s and that a healthy economy is the best guarantee of combating imperialism.

Gorbachev appears to be trying to ease pressure for defense spending by diplomacy and effective public relations:

- In February he placed unusual emphasis on the role of diplomacy in national security, telling the party congress that "the nature of today's weapons denies any state the hope of defending itself solely by military-technical means . . . security is increasingly a political task, and it must be solved by political means."
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  Gorbachev and his advisers have privately exuded optimism about their ability to play on Western public opinion and boost efforts to restrain US defense spending.
- Gorbachev has taken a number of steps—the nuclear test moratorium, shifts in arms control proposals, offers of troop cuts, and changes in verification policy—that significantly modify Soviet positions, bring some closer to Western positions, and appeal to Western public opinion.

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Military Reaction to Gorbachev's Defense Policy

Military reaction in both public and private commentary ranges from enthusiastic support to quiet resignation. Gorbachev apppears to have a fair amount of support among some officers, who may take a longer term view of national security and may believe their career advancement will depend on their loyalty. Statements by some Soviet military leaders suggest

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they recognize that future military power demands major improvements in economic performance:

- Since at least the late 1970s and particularly since Gorbachev's election, some military officers have argued that new weapon systems depend heavily on advanced technology such as robots, computer-controlled machine tools, flexibile manufacturing systems, and the latest generation of computers—all areas stressed in the modernization drive.

- [redacted] Marshal Nikolay Ogarkov—who has pushed aggressively for modernization of conventional forces and shown concern about Western technological developments—said in 1981 that economic problems are a major obstacle to sustaining an increased level of military spending. [redacted]

While defense industry leaders have a long-term interest in the modernization program, the program could exacerbate friction in the short term as military procurement and defense industry modernization increasingly compete for priority with machine building for the civilian sector (see the article "The Soviet Machinery and Metalworking Complex: Under the Gun"):

- The military newspaper *Red Star* published an article last winter by a major general who expressed uneasiness about the failure of the new party program to include a promise to supply the military with all "modern means" to secure the national defense. He suggested a return to the wording of the 1961 program, but this change was not among those accepted at the party congress that approved the program.

- Gorbachev allies Premier Nikolay Ryzhkov and secretary Lev Zaykov (the latter oversees defense industries) have publicly advocated more defense industry assistance to the civilian economy, including light industry, and several defense industry managers have been criticized by the Politburo for producing shoddy consumer goods. These developments probably have generated some tension with defense industry leaders. [redacted]

Over the longer haul, Gorbachev could find it more difficult to sustain support from the military and defense industry managers. While the high level of past investments in the defense industry gives him breathing space in the near term to forgo further expansion of plant and equipment in that sector, he will come under increasing pressure to invest in defense industry for the production of the next generation of weapons toward the end of the decade. The severity of the competition for resources will depend on the success of his modernization strategy. If it falls far short of plan goals, as we now expect, Gorbachev will have to choose between diverting resources from his modernization goals and stinting on defense industry needs. These choices will be more difficult if his foreign policy strategy—heavily reliant on negotiations to avert major new threats like SDI—fails to bring favorable results. (See "Resource Implications of Soviet Reactions to the Strategic Defense Initiative.") [redacted] 25X1

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Security Concerns

Gorbachev's foreign and arms control policies appear to be even more controversial with the military than his resource allocation decisions, judging by numerous [redacted] open sources. There has been evidence of military concern on several key fronts: 25X1

- *Arms control.* The military has reportedly been anxious about shifts in the Soviet position to facilitate reengagement with the United States. [redacted] 25X1 25X1

- *Summit.* Chief of the General Staff Sergey Akhromeyev was pessimistic in public and private about prospects for improved relations after the Geneva summit, and the military press was restrained in its praise of Gorbachev's performance.

- *Far East initiative.* Several sources of the US Embassy in Moscow have suggested that the military was not happy with some elements of Gorbachev's July proposals to withdraw some forces from [redacted] 25X1

Afghanistan and Mongolia and with the possible opening of Vladivostok—the headquarters of the Soviet Pacific Fleet—to foreigners.

- *Moratorium.* Several Soviet officials, including Gorbachev, have suggested that the military does not enthusiastically support his nuclear testing moratorium. They may be uneasy about its open-ended nature—it has already been extended four times—and their ability to keep pace with SDI without testing. A senior military officer publicly alluded to differences, while denying any military-political rift.

- *Verification.* Articles by senior military leaders suggest their continued uneasiness with on-site inspections, and military representatives at arms forums have resisted intrusive verification as tantamount to espionage despite Gorbachev's public statements accepting the principle.

Civilian Echoes of Military Concerns

Some of Gorbachev's Politburo colleagues reportedly shared, at least in part, the military's uneasiness after last year's summit meeting:

- Gorbachev's tone at the November 1985 Supreme Soviet following the summit was defensive, stressing the positive nature of US commitment to the reengagement process and the opportunities this affords for influencing public opinion. The Politburo statement on the summit, however, played down the atmospherics and stressed the need for progress on SDI. Premier Ryzhkov subsequently argued against those who "belittled" the results.

- President Andrey Gromyko reportedly shares some of the military's concerns about Gorbachev's strategy of reengagement with the United States. His public endorsements of the Geneva summit were not as strong as those of other Politburo members. This may have reflected Gromyko's annoyance at having been excluded from the summit.

- Ukrainian party boss Vladimir Shcherbitskiy, a full member of the Politburo and longtime supporter of defense interests, acted as a spokesman for those in the military who challenged the wisdom of last year's summit. Shcherbitskiy's public statements after the summit indicated he was closer to Akhromeyev's pessimism than Gorbachev's optimism about prospects for improving relations with the United States.

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Reshaping the Military

Despite these diverse signs of unhappiness with many of his security policies, Gorbachev probably does not face a concerted political challenge from the military or his colleagues. So far, he has had the initiative and has effectively employed his control of appointments to strengthen his position:

- His success in pressing his security agenda has been facilitated by the turnover of the political leadership since Brezhnev's death. The Politburo is dominated by Gorbachev allies.

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- The top leadership may now be less sensitive to military concerns. While many of the leaders from Brezhnev's generation had close ties to the military or had served in the Second World War, only two current full members of the Politburo—Shcherbitskiy and KGB chief Viktor Chebrikov—served in the military.

- Gorbachev has made key changes in the military leadership, including the naming of three new service chiefs and one additional deputy minister, a new first deputy minister, and the head of the Main Political Directorate.

- Gorbachev has taken steps to replace top Brezhnev-era defense managers—appointing new heads of the Council of Ministers' Military Industrial Commission and the party's Defense Industry Department.

The political influence of the military has also been eroded by the loss of its two most forceful spokesmen in 1984 with the death of Defense Minister Ustinov and the demotion of Marshal Ogarkov from Chief of the General Staff. Ustinov's replacement, the

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75-year-old Marshal Sergey Sokolov, is not a politically influential figure and has only candidate membership on the Politburo in contrast to his two predecessors, who were full members. General Staff Chief Akhromeyev is less assertive than his outspoken predecessor, Marshal Ogarkov. If Ogarkov's aggressiveness in advocating military needs contributed to his demotion, [redacted] this could make Akhromeyev less inclined to challenge Gorbachev. 25X1

[redacted] 25X1

Prospects

The current level of skepticism about Gorbachev's approach among some civilian and military leaders is not sufficient to challenge Gorbachev politically in the short term. He commands a dominant position in the Politburo, having routed the Brezhnev old guard, and retains operational control over foreign policy. His allies appear to have endorsed his strategy for dealing with the United States and are willing to allow time for Gorbachev to demonstrate that his strategy of holding down increases in military spending to modernize the economy will work. [redacted] 25X1

Gorbachev's strategy of constraining defense spending and pursuing a more conciliatory arms control policy, however, is politically risky. Although he has support for now, current signs of resistance lay the groundwork for political challenge if his modernization drive stalls and his efforts to manage the renewed Western challenge to Soviet interests prove ineffective. At that point, the choices will become much tougher and Gorbachev will find it more difficult to keep to his present course. A major deterioration of the international situation might even sway some of Gorbachev's own supporters—like Premier Ryzhkov or second secretary Ligachev—and force him to modify or possibly abort altogether his approach. [redacted] 25X1

[redacted] 25X1

Other Topics

Soviet Construction Problems: Potential for Disrupting Industrial Modernization

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Acceleration of scientific and technical progress is the main direction of economic strategy. The most important thing is the need for drastic change in investment . . . policy. We must . . . move the center of gravity from new construction to the technical reequipping of enterprises.

Mikhail S. Gorbachev
12 June 1985

Revitalizing the national economy through industrial modernization is the centerpiece of General Secretary Gorbachev's economic program. He clearly intends to foster economic growth by shifting resources away from new construction to renovation, from plant expansion to plant modernization. Despite numerous attempts by the central authorities to modify construction practices, improvements in performance have been slow. To accomplish the reequipment and modernization of existing enterprises, the General Secretary must be more successful than any of his predecessors were in streamlining the construction sector's organization and changing its investment strategy.

The Troubled Construction Sector

The state of affairs in capital construction is holding back the resolution of many questions and, I would say, is evoking certain concern.

Mikhail S. Gorbachev
5 September 1985

The Soviet construction sector is massive. Ten ministries [1] have a direct or indirect role in the construction process and employ 11.3 million persons, nearly 10 percent of the Soviet work force. The percentage of total investment funds devoted to construction has declined during the 1981-85 period, but it has consistently amounted to approximately 6 billion rubles annually (see table).

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In his speech before the 27th Party Congress in February, Premier Nikolay Ryzhkov criticized current performance and identified four key disturbing trends:

- *Lengthy construction periods.* The Soviets have planned for the entire construction process to take approximately nine years. The inclusion of a project in the plan for design work is to take one year after the design organization receives the necessary data from the customer. The design process alone is to take three to five years for a large enterprise. Finally, physical construction is to take three years.

[1] Construction in the Northern and Western Regions of the USSR; Construction in the Southern Regions of the USSR; Construction in the Urals and West Siberian Regions; Construction in the Eastern Regions of the USSR; Rural Construction; Transport Construction; Construction of Petroleum and Gas Industry Enterprises; the Construction Materials Industry; Construction, Road, and Municipal Machine Building; and Installation and Special Construction Work.

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USSR: Construction's Share of Investment

	Investment in Construction *(billion 1984 rubles)*	Percent of Total Investment
1976-80	28.1	3.9
1981	5.8	3.7
1982	6.3	3.9
1983	6.4	3.7
1984	6.0	3.4
1985	6.1	3.4
1986 plan	6.1 [a]	3.2

[a] Estimated.

Source: *Narodnoye khozyaystvo SSSR (Narkhoz)*, various years.

[redacted]

According to the Soviet State Bank for Capital Development (Stroybank), however, physical construction alone actually takes nine years or more, the planned length of the entire process.

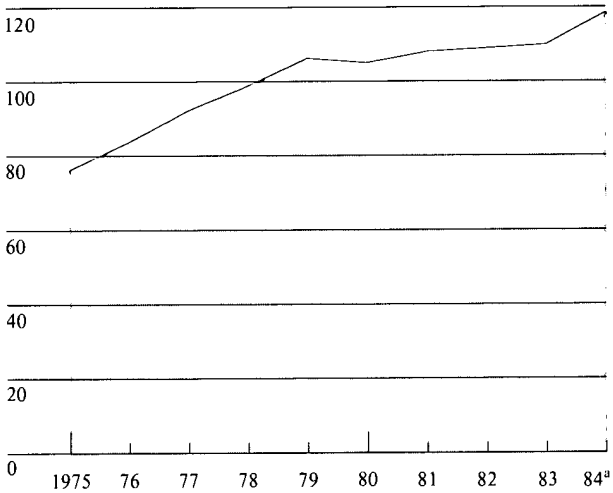
- *Cost overruns.* Complaints regularly appear in the Soviet press about the lack of documentation for projects included in plans for construction organizations. Cost estimates, when provided initially, are often rudimentary, no doubt purposely so that projects will be approved. As construction proceeds, further details become available, and they often require substantial increases in cost over the original estimate.

- *Technological lag.* The process of design and cost estimation is based on sets of norms and standard designs developed five to seven years earlier. Moreover, dependence on manual labor and the corresponding lack of sophisticated construction machinery contribute to technological inefficiency.

- *The large stock of unfinished construction.* The construction sector has borne much of the criticism over the past 15 years for growth in the stock of unfinished construction, which reached 118 billion rubles in 1984 (see figure). Complaints have centered on the use of the volume of construction/ assembly work performed as the chief indicator of plan fulfillment for construction organizations. Targets for this indicator are most easily fulfilled if the construction organization concentrates its efforts on material-intensive rather than labor-intensive phases of construction. Basic construction of the shell of a facility tends to be material-intensive in comparison with finishing work, which requires a greater proportion of labor input. Before changes in the incentive system over the last few years, it was in the interest of the construction organization to undertake as many construction starts as possible. [redacted]

Figure 1
USSR: Volume of Unfinished Construction, 1975-84

Billion rubles



[a] Most of the increase is due to a price change effective in 1984.

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The Belorussian Experiment: A Foundation for the Future?

In construction . . . advanced experience will have to be more widely used . . . the successes of the Belorussian builders, for example.

Mikhail S. Gorbachev
15 June 1986

Improvement in construction performance requires a comprehensive reorganization of the sector and a redirection of investment to emphasize renovation rather than new construction. A large-scale experiment with a new system of planning construction, launched in 1976 by the Ministry of Industrial Construction of the Belorussian SSR, serves as a model for bringing the construction sector under control. The essence of the experiment was an attempt to remove the incentives for fulfilling plans through excessive material-intensive construction. The key plan indicator for construction organizations under the experiment was commercial construction output; settlement with construction clients was to be based on *completed* projects. The construction organization was required to finance any unfinished construction itself. Interest charges on bank credits were to play an additional incentive role for on-schedule or early completion. Although these interest rates were low, higher rates were to be applied to financing projects that exceeded planned construction periods. Improvements in the performance of the construction sector in Belorussia were reported in the 1976-80 period. Over the 1981-85 period, the number of projects was reduced by 21 percent, the average building time was decreased by 29 percent, the overall volume increased 19 percent, and the commissioning of fixed assets rose by 23 percent.

In 1979 a Central Committee resolution on planning and management mandated the transfer by 1981 of all construction organizations throughout the country to the system of planning and calculation of plan fulfillment developed in Belorussia. The emphasis on renovation was reiterated, and special bonuses for fulfillment of reconstruction work were to be established. The lack of incentives that would ensure that each participant in the construction process had an interest in optimal rates of completion at lower cost was still a problem, however, and reduced the impact of the new system of planning and settlement. Moreover, the system was only haphazardly adopted by 1981, and, although its acceptance has grown, it still has not been adopted by all construction organizations.

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Measures Complementing the Experiment

During the 11th Five-Year Plan (1981-85), several measures were introduced and recommendations put forward to complement the features of the Belorussian experiment. These included:

- Introduction of the brigade contract method of labor organization, in which a brigade of workers agrees to complete a phase of construction work in the planned period of time and the construction organization agrees to provide the necessary inputs. The brigade contract method has received praise in the Soviet press, and Moscow plans to expand its use.

- A recommendation to undertake construction on a turnkey basis, under which a general contractor fulfills all the functions involved in the construction process and the customer secures the financing of the entire project.

- A recommendation to tighten the easy credit now available for construction projects and place it under the control of one central organization. Enterprises would have to compete for funds on the basis of efficiency and reduce excessive demands for material and financial resources.

- The introduction of a new system of delivering material in complete sets to assure timely provision of supplies and equipment for installation. The failure of materials to arrive at construction sites on schedule had prompted recurrent complaints from construction organizations and hampered the successful introduction of the turnkey method. In 1986, construction organizations using the new system are to account for a majority of all construction in the country.

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Two obstacles to improved labor productivity in construction that were not addressed are the continued excessive use of manual labor to accomplish construction tasks and construction machinery that is heavy and underpowered in comparison with foreign equipment. Both problems will have to be overcome if Gorbachev is to successfully modernize and streamline the construction sector.

Gorbachev's Ideas: Some Old, Some New

We cannot bypass the problems of capital construction. The process of renovation has become protracted. Turnkey construction . . . still does not go beyond good wishes. A thorough streamlining of the entire industry will have to be undertaken.

Mikhail S. Gorbachev
12 June 1986

Gorbachev clearly intends to confront the problems of construction directly. He has repeatedly criticized the sector for its waste and low level of development. During the 27th Party Congress, Ryzhkov called for better implementation of measures already adopted to improve performance. He was probably referring to widespread adoption of the Belorussian experiment, the brigade contract method, delivery of material in complete sets, and construction on a turnkey basis. His previous statements indicate that he also envisages a greater involvement of the State Planning Committee in balancing new construction with the availability of resources and in prioritizing projects and sees a larger role for Stroybank in overseeing investment projects.

Ryzhkov recently called for additional measures to be taken in 1986-90:

- A reorganization of the construction sector. In late August, the Soviets—with the aim of improving management in the construction sector—changed Gosstroy to the USSR State Construction Committee and placed it under the USSR Council of Ministers as a permanent body for administration of the construction sector. In addition, four ministries responsible for construction in various regions of the Soviet Union were created. Although these changes indicate the seriousness with which the Soviets regard the improvement of the construction sector, we have no indication of the lines of authority between the new committee and these new ministries nor of the responsibilities of the remaining construction ministries.

- A drastic streamlining, beginning in 1987, of the number of construction projects under way. According to the Premier, there are over 300,000 projects under way in the USSR. 25X1

- A reduction, by half, of construction time. According to Stroybank, 25 percent of the current projects were begun 10 to 20 years ago.

- A crash modernization of the construction sector. Greater use is to be made of prefabricated materials; delivery of new machinery—especially power tools and automated equipment—is to increase; and a 50- to 100-percent increase in the use of aluminum, plastic, and other lightweight materials is planned.

- A fundamental improvement in construction design work that incorporates the latest technological advances. 25X1

Prospects

The problems facing the construction industry are immense and cannot be corrected overnight. Indeed, we do not expect the leadership's efforts to improve performance dramatically, at least in the short run. Unless investment is shifted to equipment for renovation, Gorbachev's modernization program will be disrupted. More specifically, construction enterprises will remain ill equipped to carry out renovation work. However, even if such a shift is accomplished, doing so may not be as cost effective as Soviet planners foresee (see inset). 25X1 25X1

In addition to a shift of investment priorities, the Belorussian incentive system will have to be successfully assimilated throughout the economy before substantial improvements can take place. Even if this is

Renovation Versus New Construction: Only Benefits?

A major advantage of renovation, in theory, is the savings in time and costs that it offers. Existing buildings and structures supposedly can be used with little or no alteration while obsolescent machinery and equipment are replaced with technologically advanced models. The installation of automated production lines, however, often requires extensive alterations of existing factory buildings, including improvements in light and ventilation. Moreover, traditional Soviet construction practices have favored heavy prefabricated concrete structures. Although more durable than those built of lighter materials, these buildings are less amenable to the alterations that are usually needed to accompany equipment replacement. Soviet design practice favors the use of overhead bridge cranes, rather than more mobile lifting and transport equipment. Bridge cranes require heavy columns and overhead building supports that limit the possibility of rearranging the use of floorspace. These features of Soviet industrial construction often have required costly and time-consuming reconstruction as part of equipment replacement programs. Consequently, the theoretical savings in costs and time envisaged by the Soviets may not be fully realized. [redacted] 25X1

The replacement effort has also been confounded by the nature of Soviet construction organizations. They are best suited to building new plants, where standardized techniques can be used on a large scale. Renovation is typically carried out on a smaller scale, requiring specialized techniques for which construction organizations are ill prepared. The incentive system is still skewed toward those indicators that characterize new construction. As a result, renovations are often performed by inefficient repair units from the enterprises being reequipped, rather than by autonomous units specializing in renovations. [redacted] 25X1

accomplished, additional problems, inherent in the Soviet system, may prevent success. In the critical machine-building industry, for example, firms will continue to favor the manufacture of serial, standardized equipment rather than machines tailored to specific conditions and tasks of enterprises under renovation. Managers of design organizations will prefer the planning of new enterprises to the renovation of existing plants, because standard serial projects are easier to complete and more profitable. In addition, if the enterprise's own workers play a greater role in its renovation—as called for by Ryzhkov—problems could arise between the enterprise workers and the specialized construction workers who are supposedly better trained and equipped. [redacted] 25X1

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